

**METHOD AND APPARATUS FOR MANAGING HISTORY LOGS IN A DATA
PROCESSING SYSTEM**

5

BACKGROUND OF THE INVENTION

1. Technical Field:

The present invention relates generally to an improved data processing system, and in particular to a
10 method and apparatus for managing data. Still more particularly, the present invention provides a method, apparatus, and computer implemented instructions for managing history logs generated by a browser.

15 **2. Description of Related Art:**

The Internet, also referred to as an "internetwork", is a set of computer networks, possibly dissimilar, joined together by means of gateways that handle data transfer and the conversion of messages from protocols of
20 the sending network to the protocols used by the receiving network (with packets if necessary). When capitalized, the term "Internet" refers to the collection of networks and gateways that use the TCP/IP suite of protocols.

25 The Internet has become a cultural fixture as a source of both information and entertainment. Many businesses are creating Internet sites as an integral part of their marketing efforts, informing consumers of the products or services offered by the business or
30 providing other information seeking to engender brand loyalty. Many federal, state, and local government agencies are also employing Internet sites for

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informational purposes, particularly agencies, which must interact with virtually all segments of society such as the Internal Revenue Service and secretaries of state. Providing informational guides and/or searchable
5 databases of online public records may reduce operating costs. Further, the Internet is becoming increasingly popular as a medium for commercial transactions.

Currently, the most commonly employed method of transferring data over the Internet is to employ the
10 World Wide Web environment, also called simply "the Web". Other Internet resources exist for transferring information, such as File Transfer Protocol (FTP) and Gopher, but have not achieved the popularity of the Web. In the Web environment, servers and clients affect data
15 transaction using the Hypertext Transfer Protocol (HTTP), a known protocol for handling the transfer of various data files (e.g., text, still graphic images, audio, motion video, etc.). The information in various data files is formatted for presentation to a user by a
20 standard page description language, the Hypertext Markup Language (HTML). In addition to basic presentation formatting, HTML allows developers to specify "links" to other Web resources identified by a Uniform Resource Locator (URL). A URL is a special syntax identifier
25 defining a communications path to specific information. Each logical block of information accessible to a client, called a "page" or a "Web page", is identified by a URL. The URL provides a universal, consistent method for finding and accessing this information, not necessarily
30 for the user, but mostly for the user's Web "browser". A browser is a program capable of submitting a request for information identified by an identifier, such as, for

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example, a URL. A user may enter a domain name through a graphical user interface (GUI) for the browser to access a source of content. The domain name is automatically converted to the Internet Protocol (IP) address by a
5 domain name system (DNS), which is a service that translates the symbolic name entered by the user into an IP address by looking up the domain name in a database.

A history list is recorded to identify URLs that have been visited by a user. Also, a location list
10 containing URLs entered by the user is present. In some instances, a user may desire to write to a file the specific sites visited during one session or the ability re-run the same history list.

Therefore, it would be advantageous to have an
15 improved method and apparatus for identifying and presenting the history of Web pages viewed by a user.

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SUMMARY OF THE INVENTION

5 The present invention provides for a method and
apparatus for managing a history for a browser in a data
processing system. A history is recorded for a browser
during a browsing session and saved in a file. The
history may be presented to a user in a fashion similar
10 to a video or slide show presentation in which Web pages
in the history are sequentially presented in the order of
visitation. The presentation of the history may be
manipulated through a set of controls, such as a play
button, a reverse button, a fast forward button, and a
15 stop button. Portions of the history may be deleted
and/or selectively exported for analysis or later use.

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BRIEF DESCRIPTION OF THE DRAWINGS

The novel features believed characteristic of the invention are set forth in the appended claims. The invention itself, however, as well as a preferred mode of use, further objectives and advantages thereof, will best be understood by reference to the following detailed description of an illustrative embodiment when read in conjunction with the accompanying drawings, wherein:

Figure 1 is a pictorial representation of a data processing system in which the present invention may be implemented in accordance with a preferred embodiment of the present invention;

Figure 2 is a block diagram of a data processing system in which the present invention may be implemented;

Figure 3 is a diagram illustrating components used in disabling recording of a history in accordance with a preferred embodiment of the present invention;

Figure 4 is a block diagram of a browser program in accordance with a preferred embodiment of the present invention;

Figure 5 is a diagram of a graphical user interface used to present and manipulate a log in accordance with a preferred embodiment of the present invention;

Figure 6 is a diagram of a graphical user interface used to present and manipulate a log in accordance with a preferred embodiment of the present invention;

Figure 7 is a flowchart of a process used for logging Web site visitations in accordance with a preferred embodiment of the present invention;

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Figure 8 is a flowchart of a process used for manipulating presentation of a log in accordance with a preferred embodiment of the present invention;

Figure 9 is a flowchart of a process used for
5 manipulating presentation of a log in accordance with a preferred embodiment of the present invention; and

Figure 10 is a flowchart of a process used for exporting a log in accordance with a preferred embodiment of the present invention.

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DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

5 With reference now to the figures and in particular
with reference to **Figure 1**, a pictorial representation of
a data processing system in which the present invention
may be implemented is depicted in accordance with a
preferred embodiment of the present invention. A
10 computer **100** is depicted which includes a system unit
102, video display terminal **104**, keyboard **106**, storage
devices **108**, which may include floppy drives and other
types of permanent and removable storage media, and mouse
110. Additional input devices may be included with
15 personal computer **100**, such as, for example, a joystick,
touchpad, touch screen, trackball, microphone, and the
like. Computer **100** can be implemented using any suitable
computer, such as an IBM RS/6000 computer or
IntelliStation computer, which are products of
20 International Business Machines Corporation, located in
Armonk, New York. Although the depicted representation
shows a computer, other embodiments of the present
invention may be implemented in other types of data
processing systems, such as a network computer. Computer
25 **100** also preferably includes a graphical user interface
that may be implemented by means of systems software
residing in computer readable media in operation within
computer **100**.

With reference now to **Figure 2**, a block diagram of a
30 data processing system is shown in which the present
invention may be implemented. Data processing system **200**
is an example of a computer, such as computer **100** in

Figure 1, in which code or instructions implementing the processes of the present invention may be located. Data processing system **200** employs a peripheral component interconnect (PCI) local bus architecture. Although the depicted example employs a PCI bus, other bus architectures such as Accelerated Graphics Port (AGP) and Industry Standard Architecture (ISA) may be used. Processor **202** and main memory **204** are connected to PCI local bus **206** through PCI bridge **208**. PCI bridge **208** also may include an integrated memory controller and cache memory for processor **202**. Additional connections to PCI local bus **206** may be made through direct component interconnection or through add-in boards. In the depicted example, local area network (LAN) adapter **210**, small computer system interface (SCSI) host bus adapter **212**, and expansion bus interface **214** are connected to PCI local bus **206** by direct component connection. In contrast, audio adapter **216**, graphics adapter **218**, and audio/video adapter **219** are connected to PCI local bus **206** by add-in boards inserted into expansion slots. Expansion bus interface **214** provides a connection for a keyboard and mouse adapter **220**, modem **222**, and additional memory **224**. SCSI host bus adapter **212** provides a connection for hard disk drive **226**, tape drive **228**, and CD-ROM drive **230**. Typical PCI local bus implementations will support three or four PCI expansion slots or add-in connectors.

An operating system runs on processor **202** and is used to coordinate and provide control of various components within data processing system **200** in **Figure 2**. The operating system may be a commercially available operating system such as Windows 2000, which is available from

Microsoft Corporation. An object oriented programming system such as Java may run in conjunction with the operating system and provides calls to the operating system from Java programs or applications executing on data processing system 200. "Java" is a trademark of Sun Microsystems, Inc. Instructions for the operating system, the object-oriented programming system, and applications or programs are located on storage devices, such as hard disk drive 226, and may be loaded into main memory 204 for execution by processor 202.

Those of ordinary skill in the art will appreciate that the hardware in **Figure 2** may vary depending on the implementation. Other internal hardware or peripheral devices, such as flash ROM (or equivalent nonvolatile memory) or optical disk drives and the like, may be used in addition to or in place of the hardware depicted in **Figure 2**. Also, the processes of the present invention may be applied to a multiprocessor data processing system.

For example, data processing system 200, if optionally configured as a network computer, may not include SCSI host bus adapter 212, hard disk drive 226, tape drive 228, and CD-ROM 230, as noted by dotted line 232 in **Figure 2** denoting optional inclusion. In that case, the computer, to be properly called a client computer, must include some type of network communication interface, such as LAN adapter 210, modem 222, or the like. As another example, data processing system 200 may be a stand-alone system configured to be bootable without relying on some type of network communication interface, whether or not data processing system 200 comprises some type of network communication interface. As a further

example, data processing system **200** may be a personal digital assistant (PDA), which is configured with ROM and/or flash ROM to provide nonvolatile memory for storing operating system files and/or user-generated data.

The depicted example in **Figure 2** and above-described examples are not meant to imply architectural limitations. For example, data processing system **200** also may be a notebook computer or hand held computer in addition to taking the form of a PDA. Data processing system **200** also may be a kiosk or a Web appliance. The processes of the present invention are performed by processor **202** using computer implemented instructions, which may be located in a memory such as, for example, main memory **204**, memory **224**, or in one or more peripheral devices **226-230**.

With reference now to **Figure 3**, a diagram illustrating components used in disabling recording of a history is depicted in accordance with a preferred embodiment of the present invention. Browser **300** is an example of a browser, which may be executing on data processing system **200** in **Figure 2**.

In this example, browser **300** receives Web page **302** for presentation. Web page **302** may be obtained by entering a URL. This URL may be stored in location list **304**. Location list **304** contains URLs entered by the user. These URLs are typically entered through a field, which is often called an "address bar". Additionally, the URL may be stored in history list **306**. Further, history list **306** stores URLs to sites visited by the user by other means, such as a selection of a link. History

list **306** also may contain a record of the date and time a Web page was visited by the user.

Cache **308** provides for temporary storage of Web pages received by the browser. For example, images and text for Web page **302** may be stored in cache **308**. Cache **308** provides a quick way to redisplay Web page **302** if the user later returns to Web page **302**. Another storage of information that may be used to trace or identify Web pages visited by a user is cookie file **310**. A hidden data field, which may be included in the HTTP header of an HTML file, is a "cookie" data field. A cookie is an HTTP protocol header document element, which may be used to provide multiple data elements to the browser. Some Web sites may not function properly when the acceptance of cookies is disabled by the browser. Therefore, a user may not be able to access a Web site without having cookies accepted by the browser.

The information collected and stored by browser **300** are examples of data that form a history. The present invention provides a method, apparatus, and computer implemented instructions for logging Web site visitations. The mechanism of the present invention generates log **312**, which is a record of a Web site visited by a user during a browser session using browser **300**. This log may include, for example, a title for the Web page visited, the specific URL address, when a user first visited this site, when the user last visited this site the expiration time, the number of times the user has visited this site, the site most often visited, and the sites visited by the user by days. Additionally, the mechanism of the present invention provides a graphical user interface to present a log to the users. This

interface allows the user to decide which portions of the log to keep, delete, or package for export. In this example, the log is presented as a video or slide show in which Web pages retrieved by the browser are presented
5 for review. The controls in the interface may allow the user to manipulate the log in a fashion similar to a video. For example, a user may fast forward, reverse, or alter the speed at which Web pages are presented. Additionally, an index or tree view may be provided for
10 selecting portions of the log for presentation. This log also may be stored or exported for review at a later time.

Turning next to **Figure 4**, a block diagram of a browser program is depicted in accordance with a
15 preferred embodiment of the present invention. A browser is an application used to navigate or view information or data in a distributed database, such as the Internet or the World Wide Web. In particular, processes may be included within browser **400** to disable recording a
20 history.

In this example, browser **400** includes a user interface **402**, which is a graphical user interface (GUI) that allows the user to interface or communicate with browser **400**. This interface provides for selection of
25 various functions through menus **404** and allows for navigation through navigation **406**. For example, menu **404** may allow a user to perform various functions, such as saving a file, opening a new window, displaying a history, and entering a URL. Navigation **406** allows for a
30 user to navigate various pages and to select web sites for viewing. For example, navigation **406** may allow a user to see a previous page or a subsequent page relative

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to the present page. Additionally, menu **404** may allow a user to disable history recording through the selection of a button. The processes in graphical user interface **402** are employed to present logs to the user as well as
5 receive user input used to manipulate the logs.

Preferences such as those illustrated in **Figure 4** may be set through preferences **408**. The disablement of this history recording is accomplished by setting a preference in preference **408**.

10 Communications **410** is the mechanism with which browser **400** receives documents and other resources from a network such as the Internet. Further, communications **410** is used to send or upload documents and resources onto a network. In the depicted example, communication
15 **410** uses HTTP. Other protocols may be used depending on the implementation. Documents that are received by browser **400** are processed by language interpretation **412**, which includes HTML unit **414** and JavaScript unit **416**. Language interpretation **412** will process a document for
20 presentation on graphical display **418**. In particular, HTML statements are processed by HTML unit **414** for presentation while JavaScript statements are processed by JavaScript unit **416**.

Graphical display **418** includes layout unit **420**,
25 rendering unit **422**, and window management **424**. These units are involved in presenting Web pages to a user based on results from language interpretation **412**.

Log processes **426** include the processes of the present invention used to log Web site visitation as well
30 as present and manipulate the logs. Log processes **426** employs graphical user interface **402** to provide

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input/output in presenting logs and receiving user input manipulating the logs. In these examples, the processes are shown as being implemented within log processes **426** for purposes of illustration. The mechanism of the present invention may be implemented in other ways depending on the particular implementation. For example, these processes may be implemented as a plug-in or as a separate application.

Browser **400** is presented as an example of a browser program in which the present invention may be embodied. Browser **400** is not meant to imply architectural limitations to the present invention. Presently available browsers may include additional functions not shown or may omit functions shown in browser **400**. A browser may be any application that is used to search for and display content on a distributed data processing system. Browser **400** may be implemented using known browser applications, such as Netscape Navigator or Microsoft Internet Explorer. Netscape Navigator is available from Netscape Communications Corporation while Microsoft Internet Explorer is available from Microsoft Corporation.

Turning next to **Figure 5**, a diagram of a graphical user interface used to present and manipulate a log is depicted in accordance with a preferred embodiment of the present invention. Graphical user interface **500** may be implemented in browser **400** in **Figure 4**.

In this example, graphical user interface **500** takes the form of a window. Web pages contained in the log are presented within page field **502**. These Web pages are presented in a fashion similar to a video or slide show. A user may manipulate the presentation using reverse button **504**, stop button **506**, play button **508**, and fast

forward button **510**. Additionally, index field **512** presents information, such as Web site and page to the user. A particular entry in index field **512** may be emphasized by underlying **514**. Of course, other

5 indicators, such as highlighting or font changes may be used to indicate a particular page being presented within page field **502**. A user may delete an entire log by selecting "Delete" button **516**. Portions of a log may be deleted by selecting a particular Web page from index

10 field **512** and selecting "Delete" button **516**. "Export" button **518** allows for a log to exported for use or review by another program or computer system. Selection of "Cancel" button **520** cancels any selections made in graphical user interface **500**. "Done" button **522** is

15 selected to close graphical user interface **500**.

Turning next to **Figure 6**, a diagram of a graphical user interface used to present and manipulate a log is depicted in accordance with a preferred embodiment of the present invention. Graphical user interface **600** may be

20 implemented in a browser, such as browser **400** in **Figure 4**.

Page field **602** is the portion of graphical user interface used to present Web pages similar to page field **502** in **Figure 5**. Reverse button **604**, stop button **606**,

25 play button **608**, and fast forward button **610** provide controls used to manipulate the presentation of Web pages from a log within page field **602**. Tree field **612** provides a tree presentation of information within the log. Node **614** indicates a particular session while nodes

30 **616** and **618** identify Web sites within the log. Nodes **620**, **622**, **624**, **626**, **628**, and **630** identify Web pages

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within the log. Selection of a node identifying a Web page results in presentation of the page within page Field **602**.

"Delete" button **632**, "Export" button **634**, "Done" button **636**, and "Cancel" button **638** provide functions similar to "Delete" button **516**, "Export" button **518**, "Cancel" button **520**, and "Done" button **522** in **Figure 5**.

Turning next to **Figure 7**, a flowchart of a process used for logging Web site visitations is depicted in accordance with a preferred embodiment of the present invention. The process illustrated in **Figure 7** may be implemented in a browser, such as browser **400** in **Figure 4**.

The process begins by receiving a start input (step **700**). This start input may take various forms. For example, a start input may be an initiation of a browser session or a user input. Next, Web sites visited are placed in a log (step **702**). This log file may include one or more of the following: the title, the URL address, the first visited time, the last visited time, the expiration time, the visit count, date visited, and most recently visited. A determination is made as to whether a stop input is received (step **704**). A stop input may be, for example, the termination of a browser session or a user input. If a stop input is not received, the process returns to step **702** as described above. Otherwise, the logging ends (step **706**) with the process terminating thereafter.

With reference now to **Figure 8**, a flowchart of a process used for manipulating presentation of a log is depicted in accordance with a preferred embodiment of the

present invention. The process illustrated in **Figure 8** may be implemented in a browser, such as browser **400** in **Figure 4** in presenting a graphical user interface, such as graphical user interface **500** in **Figure 5** or graphical user interface **600** in **Figure 6**.

The process begins by receiving a user input (step **800**). A determination is made as to whether the user input is a selection of a play button (step **802**). If the user input is a selection of a play button, then Web pages are presented to the user (step **804**) with the process returning to step **800**. The presentation in these examples is made in a page field, such as page field **502** in **Figure 5**. A presentation is a sequential display of Web pages within the log. This presentation is similar to a video or slide show.

Next, if the play button is not selected in step **802**, a determination is made as to whether the user input is a selection of a fast forward button (step **806**). If the user input is a selection of a fast forward button, then the presentation of Web pages is increased at a speed faster than the normal play speed (step **808**) with the process returning to step **800** thereafter. With reference again to step **806**, if the user input is not a selection of the fast forward button, a determination is made as to whether the user input is a selection the reverse button (step **810**). If the user input is a selection of the reverse button, then the presentation of the Web pages is reversed (step **812**) with the process then returning to step **800**.

If in step **810**, the reverse button is not the selected user input, a determination is made as to

whether a stop button is selected by the user input (step 814). If the user input is a selection of a stop button, the presentation of the Web pages is halted (step 816) with the process then returning to step 800 as described above. Otherwise, the process returns to step 800 without any other action being taken with respect to the presentation of the Web pages.

With reference now to **Figure 9**, a flowchart of a process used for manipulating presentation of a log is depicted in accordance with a preferred embodiment of the present invention. The process illustrated in **Figure 9** may be implemented in a browser, such as browser 400 in **Figure 4** in presenting a graphical user interface, such as graphical user interface 500 in **Figure 5** or graphical user interface 600 in **Figure 6**.

The process begins by presenting logs to a user (step 900). Next, a user input is received (step 902). A determination is made as to whether the user input is the selection of an entry (step 904). The entry may be an entry or node, such as those illustrated in index field 512 in **Figure 5** or tree field 614 in **Figure 6**. If the user input is a selection of an entry, the entry is highlighted (step 906) and the process returns to step 902 as described above. If the user input is not the selection of an entry, a determination is made as to whether the user input is the selection of a delete button (step 908). If the user input is the selection of a delete button, all highlighted entries are deleted from the history (step 910). Then, any highlighted entries are removed from the window (step 912) and the process returns to step 902 as described above.

If the user input is not a selection of a deleted button, a determination is made as to whether the user input is the selection of an export button (step 914). If the user input is a selection of an export button, any
5 highlighted entries are exported (step 916) with the process then returning to step 902 as described above. In exporting the entries, the entries are stored in a data structure either locally on the data processing system or on a remote data processing system.

10 If the export button is not selected, a determination is made as to whether the user input is a selection of a cancel button (step 918). If the user input is the selection of a cancel button, all highlighted entries are un-highlighted (step 920) and the
15 process returns to step 902 as described above.

If the user input is not the selection of a cancel button, a determination is made as to whether the user input is the selection of a done button (step 922). If the user input is the selection of a done button, the
20 process terminates. Otherwise, the process returns to step 902 as described above.

Turning next to **Figure 10**, a flowchart of a process used for exporting a log is depicted in accordance with a preferred embodiment of the present invention. The
25 process illustrated in **Figure 10** is a more detailed description of step 916 in **Figure 9**.

The process begins by identifying a completed log (step 1000). The completed log is either an entire log or entries within a log selected by a user for export.
30 Next, the completed log is sent to a destination (step 1002) with the process terminating thereafter. The

destination may be a local or remote storage device.

Thus, the present invention provides an improved method, apparatus, and computer implemented instructions for presenting and managing logs of Web sites visited
5 using a browser. This advantage is provided through a graphical user interface for presenting logs to the user and through processes used to manipulate and export the logs. The mechanism of the present invention avoids requiring a user to perform numerous steps to locate and
10 review previously visited Web sites.

It is important to note that while the present invention has been described in the context of a fully functioning data processing system, those of ordinary skill in the art will appreciate that the processes of
15 the present invention are capable of being distributed in the form of a computer readable medium of instructions and a variety of forms and that the present invention applies equally regardless of the particular type of signal bearing media actually used to carry out the
20 distribution. Examples of computer readable media include recordable-type media, such as a floppy disk, a hard disk drive, a RAM, CD-ROMs, DVD-ROMs, and transmission-type media, such as digital and analog communications links, wired or wireless communications
25 links using transmission forms, such as, for example, radio frequency and light wave transmissions. The computer readable media may take the form of coded formats that are decoded for actual use in a particular data processing system.

30 The description of the present invention has been presented for purposes of illustration and description, and is not intended to be exhaustive or limited to the

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invention in the form disclosed. Many modifications and variations will be apparent to those of ordinary skill in the art. The embodiment was chosen and described in order to best explain the principles of the invention,
5 the practical application, and to enable others of ordinary skill in the art to understand the invention for various embodiments with various modifications as are suited to the particular use contemplated.

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